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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte HIDEYASU MATSUMURA
and
YASUTAKA TSUTSUI

Appeal 2009-005987
Application 10/541,391
Technology Center 1700

Decided: September 28, 2009

Before CHUNG K. PAK, PETER F. KRATZ, and MARK NAGUMO,
Administrative Patent Judges.

PAK, *Administrative Patent Judge.*

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's
decision finally rejecting claims 1 through 9, the only claims pending in the

application (the Final Office Action mailed January 25, 2008). We have jurisdiction under 35 U.S.C. § 6(b).¹

We REVERSE.

STATEMENT OF THE CASE

The subject matter on appeal is directed to expandable beads of a styrene-modified low-density polyethylene-based resin, a method of making the expandable beads, pre-expanded beads made from the expandable beads, and expanded molded articles made from the pre-expanded beads (Specification (Spec.) 1, ll. 10-14 and claims 1, 4, 5, 6, and 9). This appealed subject matter is similar to the subject matter considered on Appeal No. 2009-011671 (the subject matter claimed in copending Application 10/540,866). However, the polymerization temperature employed, the amount of the polystyrene component per the amount of non-crosslinked linear low-density polyethylene component employed, the amount of a graft polymer present in the gel content of the expandable beads formed, and/or the gel content of the expandable beads formed all differ. Details of the appealed subject matter are recited in illustrative claims 1, 4, and 5 reproduced from the Claims Appendix to the Appeal Brief (“App. Br.”), filed September 23, 2008 (emphasis added):

1. A method for producing expandable beads of a styrene-modified linear low-density polyethylene-based resin comprising, in the order recited, the steps of:

dispersing 100 parts by weight of non-crosslinked linear low-density polyethylene-based resin beads, 30 to 300 parts by weight of a styrene-based monomer, and *0.1 to 0.9 parts by weight of a polymerization initiator relative*

¹ A hearing was held on September 17, 2009.

to 100 parts by weight of the styrene-based monomer into a suspension containing a dispersant;

impregnating the styrene-based monomer into the low-density polyethylene-based resin beads by heating a resultant dispersion at such a temperature that polymerization of the styrene-based monomer does not substantially take place;

performing a first polymerization of the styrene-based monomer at a temperature of higher than $(T-8)^\circ\text{C}$ and lower than $(T+1)^\circ\text{C}$ (where $T^\circ\text{C}$ is a melting point of the low-density polyethylene-based resin beads);

adding a styrene-based monomer and 0.1 to 0.9 parts by weight of a polymerization initiator relative to 100 parts by weight of the styrene-based monomer when a conversion ratio of polymerization reaches to 80 to 99.9%, and performing impregnation of the styrene-based monomer into the low-density polyethylene-based resin beads and a second polymerization of the styrene-based monomer at a temperature of higher than $(T-15)^\circ\text{C}$ and lower than $(T+5)^\circ\text{C}$ (where $T^\circ\text{C}$ is a melting point of the polyethylene-based resin beads) (wherein a total amount of the styrene monomers used in the first and second polymerizations is more than 300 parts by weight and not more than 1000 parts by weight relative to 100 parts by weight of the low-density polyethylene-based resin beads); and

impregnating a volatile blowing agent during or after the polymerization,

whereby resin components of the expandable beads contain a gel component comprising 2 to 40 wt% of a graft polymer.

4. Expandable beads of a styrene-modified linear low-density polyethylene-based resin comprising a volatile blowing agent and a base resin, the base resin containing *more than 300 parts by weight and less than 1000 parts by weight of a polystyrene-based resin component relative to 100 parts by weight of a non-crosslinked*

linear low-density polyethylene-based resin component, wherein the base resin contains 2 to 40 wt% of a gel component comprising a graft copolymer of the polystyrene-based resin component and the low-density polyethylene-based resin component.

5. Expandable beads of a styrene-modified linear low-density polyethylene-based resin obtained by the method of Claim 1.

The Examiner relies on the following evidence to establish unpatentability of the claims on appeal (Examiner's Answer ("Ans."), mailed December 11, 2008, 4):

Smith	3,963,816	Jun. 15, 1976
Senda	4,368,218	Jan. 11, 1983
Wicher	6,608,150 B1	Aug. 19, 2003
Takamasa	JP 01284536	Nov. 15, 1989 ²

Applicants' admission on pages 2-3 of the Spec. directed to the content of Takamasa is used to explain the disclosure of Takamasa relied upon by the Examiner.

Appellants request review of the following Examiner's rejections (App. Br. 7-8):

1. Claims 1, 2, and 5 under 35 U.S.C. § 103(a) as unpatentable over the combined disclosures of Takamasa and Wicher;
2. Claim 3 under 35 U.S.C. § 103(a) as unpatentable over the combined disclosures of Takamasa, Wicher, and Senda;
3. Claims 8 and 9 under 35 U.S.C. § 103(a) as unpatentable over the combined disclosures of Takamasa, Wicher, and Smith;

² Our reference to Takamasa is to the corresponding English translation (translated by Schreiber Translations, Inc.) provided by U.S. Patent and Trademark Office.

4. Claim 4 under 35 U.S.C. § 103(a) as unpatentable over the disclosure of Takamasa;
5. Claims 6 and 7 under 35 U.S.C. § 103(a) as unpatentable over the combined disclosures of Takamasa and Smith; and
6. Claims 1 through 9 under nonstatutory obviousness-type double patenting as provisionally unpatentable over claims 1, 4 through 6, 9 through 11, and 14 of copending Application No. 10/540,866 assigned to Sekisui Plastics Co., Ltd.

The Examiner's § 103 rejections are premised upon the Examiner's determination that Takamasa's disclosure of, *inter alia*, the amounts of a polymerization initiator and a styrene component would have rendered the amounts of a polymerization initiator and/or a styrene component employed in forming the claimed expandable beads of a styrene-modified linear low-density polyethylene-based resin obvious to one of ordinary skill in the art (Ans. 4-17). The Examiner's non-statutory obviousness-type double patenting rejection is premised upon the Examiner's determination that certain claims of copending Application 10/540,866 drawn to expandable beads having a particular gel or graft polymer content would have rendered *inter alia*, the gel or graft polymer content of expandable beads claimed in the present application obvious to one of ordinary skill in the art (Ans. 17-18).

Appellants traverse the Examiner's § 103 rejections, arguing, among other things, that Takamasa would not have rendered the claimed amounts of a polymerization initiator and a styrene component obvious to one of ordinary skill in the art (App. Br. 10-12 and 18 and Reply Brief ("Reply Br."), filed February 11, 2009, 5-7). Appellants also traverse the Examiner's

nonstatutory obviousness-type double patenting rejection, arguing, among other things, that the Examiner has not adequately explained why and how one of ordinary skill in the art, based on the claims of copending Application 10/540,866, would have been led to form expandable beads having the claimed gel and/or graft polymer content in the present application (App. Br. 20).

ISSUES AND CONCLUSIONS

Have Appellants identified reversible error in the Examiner's determination that one of ordinary skill in the art would have been led to employ the claimed amounts of a polymerization initiator and/or a styrene component in forming the expandable beads of a styrene-modified linear low-density polyethylene-based resin recited in claims 1 through 9 within the meaning of 35 U.S.C. § 103(a)?

Have Appellants identified reversible error in the Examiner's determination that one of ordinary skill in the art would have been led to form styrene-modified linear low-density polyethylene-based resin expandable beads having the gel or graft polymer content recited in claims 1 through 9 of the present application based on the claims of copending Application 10/540,866 under nonstatutory obviousness-type double patenting?

On this record, we answer these questions in the affirmative.

FINDINGS OF FACT ("FF")

1. The Examiner finds, and Appellants do not dispute, that:

Takamasa et al. teach a method for producing expandable particles/beads of a vinyl aromatic-modified (i.e. styrene-modified) polyethylene-based resin (English-language Abstract, Lines 1-3).

. . . Takamasa et al. indicate that the polyethylene used is non-crosslinked linear low-density polyethylene. Furthermore, the composition of the polyethylene-based resin is 100 parts by weight of non-crosslinked linear low-density polyethylene-based resin beads, 5 to 300 parts by weight of a vinyl aromatic monomer (e.g. styrene-based monomer), and 1 to 3 parts by weight of a polymerization initiator relative to 100 parts by weight of the vinyl aromatic monomer. These ingredients are dispersed in an aqueous medium to obtain a dispersion (Instant Specification: Page 2, Lines 21-25 and Page 3, Lines 1-5)

The dispersion formed is heated at a temperature such that the vinyl aromatic (e.g. styrene) monomer is infiltrated/impregnated into the polyethylene resin particles/beads but polymerization of the monomer does not substantially occur (English-language Abstract, Lines 9-11).

. . . Takamasa et al. use linear low-density polyethylene-based resin beads with a melting point of 122°C (Instant Specification: Page 3, Lines 13-15). The polymerization of the vinyl aromatic (e.g. styrene) monomer is performed at a temperature of 115°C. If T °C is the melting point of the low-density polyethylene-based resin beads, this polymerization temperature falls between the range of higher than $(T-8)$ °C and lower

than (T+I) °C. [(Compare Ans. 4-5 with
App. Br. 8-20 and Reply Br. 1-12.)]

2. Takamasa teaches (p. 8) that:

If the amount [of vinyl aromatic monomer] is more than 300 parts by weight [per 100 parts by weight a non-crosslinked linear low-density polyethylene group resin], the vinyl aromatic monomer is not uniformly, entirely absorbed by the polyethylene group resin, and the monomer that is not absorbed is polymerized alone, which is not preferable. Also, the polyethylene group resin that has absorbed a large amount of vinyl aromatic monomer loses the properties intrinsic to the polyethylene.

3. Takamasa teaches (pp. 9-10) that:

If the amount [of polymerization initiator] is less than 1.0 part by weight [per 100 parts by weight of vinyl aromatic monomer], the dispersed particle diameter of the vinyl aromatic polymer in the enhanced polyethylene group resin particles being obtained is large, and in the foamed molded body being obtained by pre-foaming said particles and further heating and molding them, not only its rigidity is not improved, but the impact resistance intrinsic to the polyethylene group resin is damaged.

4. The Examiner relies on Wicher for teaching “a step-wise process for polymerizing styrene monomer using two different temperature stages” to show obviousness for employing an additional styrene polymerization step in the process of Takamasa (Ans. 5-6).

5. The Examiner relies on Senda to show obviousness of forming expandable beads having the shape and size recited in dependent claim 3 (Ans. 7).

6. The Examiner relies on Smith to show obviousness of forming expanded molded articles from pre-expanded, expandable beads of polyethylene and/or styrene (Ans. 7-10).

7. The Examiner acknowledges that the claims of the present application recite, among other things, expandable beads containing a gel component comprising 2 to 40 wt% of a graft polymer or 2 to 40 wt% of a gel component comprising a graft copolymer, rather than containing less than 2 wt% of a graft polymer or less than 2 wt% of a gel component as recited in the claims of copending Application 10/540,866 (Ans. 17-18).

PRINCIPLES OF LAW

As stated in *In re Peterson*, 315 F.3d 1325, 1329 (Fed. Cir. 2003), referring to *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 783 (Fed. Cir. 1985):

We have also held that a *prima facie* case of obviousness exists when the claimed range and the prior art range do not overlap but are close enough such that one skilled in the art would have expected them to have the same properties.

According to *In re Aller*, 220 F.2d 454, 456 (CCPA 1955):

[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.

A prior art reference teaching away from the claimed invention is evidence of nonobviousness within the meaning of 35 U.S.C. § 103(a). *In re*

Gurley, 27 F.3d 551, 553 (Fed. Cir. 1994). According to our reviewing court in *In re Gurley*, 27 F.3d at 553:

A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant. The degree of teaching away will of course depend on the particular facts; in general, a reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the applicant.

As stated by our reviewing court in *In re Braat*, 937 F.2d 589, 592 (Fed. Cir. 1991)(citation omitted):

Obviousness-type double patenting is a judicially created doctrine intended to prevent improper timewise extension of the patent right by prohibiting the issuance of claims in a second patent which are not "patentably distinct" from the claims of a first patent.

An obviousness-type double patenting analysis is analogous to an obviousness analysis under 35 U.S.C. § 103(a). *See Studiengesellschaft Kohle mbH v. N. Petrochemical Co.*, 784 F.2d 351, 355 (Fed. Cir. 1986); *In re Longi*, 759 F.2d 887, 892-93 (Fed. Cir. 1985).

The Examiner has the initial burden of establishing a *prima facie* case unpatentability. *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992) ("[T]he examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a *prima facie* case of unpatentability.").

ANALYSES OBVIOUSNESS

As the Examiner found at page 4 of the Answer, Takamasa does not teach the limitations “0.1 to 0.9 parts by weight of a polymerization initiator relative to 100 parts by weight of the styrene-based monomer” and “more than 300 parts by weight and less than 1000 parts by weight of a polystyrene-based resin component relative to 100 parts by weight of a non-crosslinked linear low-density polyethylene-based resin component” recited in claims 1 and 4, respectively. Takamasa teaches the amounts of a polymerization initiator and a styrene component outside of those claimed in forming expandable beads of a styrene-modified linear low-density polyethylene-based resin. The Examiner relies on *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 783 (Fed. Cir. 1985) and/or *In re Aller*, 220 F.2d 454, 456 (CCPA 1955) in order to establish obviousness of the claimed amounts of a polymerization initiator³ and a styrene component in expandable beads of a styrene-modified linear low-density polyethylene-based resin based on the disclosure of Takamasa.

³ Although the Examiner does not explain why the claimed amount of a polymerization initiator would have been obvious to one of ordinary skill in the art (Ans. 4-17), that reasoning is set out in the Answer submitted in a related Appeal, Appeal No. 2009-011671. In that case, the Examiner relies on the same reasoning used to establish obviousness for the claimed amount of a styrene component in this case as the reasoning for establishing obviousness of the claimed amount of a polymerization initiator. In the interest of administrative and judicial economy, we will presume that the same reasoning is used by the Examiner to establish obviousness of the claimed amount of a polymerization initiator in this case.

Notwithstanding the Examiner's arguments to the contrary, however, one of ordinary skill in the art interested in optimizing the amounts of a polymerization initiator and a styrene component employed in Takamasa would not expect to depart from the range of amounts specifically taught by Takamasa to provide desired polymer properties. *See, e.g., Aller*, 220 F.2d at 456. To do so would run counter to the direction and guidance taught by Takamasa. Nor does Takamasa provide any expectation on the part of one of ordinary skill in the art of forming styrene-modified linear low-density polyethylene-based resin expandable beads having the substantially similar properties upon using the claimed amounts of a polymerization initiator and/or a styrene component. According to Takamasa, the employment of the claimed amounts of a polymerization initiator and a styrene component imparts *inferior* properties (not the same or similar properties) to the resulting styrene-modified linear low-density polyethylene-based resin expandable beads. Thus, the factual basis for the rationale set out in *Titanium Metals*, 778 F.2d at 783, does not exist in this case. More importantly, Takamasa teaches one of ordinary skill in the art away from employing the claimed amounts of a polymerization initiator and/or a styrene component in forming styrene-modified linear low-density polyethylene-based resin expandable beads. *See, e.g., Gurley*, 27 F.3d at 553. Specifically, Takamasa teaches (pp. 8, 9, and 10) that:

If the amount [of vinyl aromatic monomer] is more than 300 parts by weight [per 100 parts by weight of a non-crosslinked linear low-density polyethylene group resin], the vinyl aromatic monomer is not uniformly, entirely absorbed by the polyethylene group resin, and the monomer that is not absorbed is polymerized alone, which is not preferable. Also, the polyethylene group resin that has absorbed a large amount of

vinyl aromatic monomer loses the properties intrinsic to the polyethylene. . . .

. . . If the amount [of polymerization initiator] is less than 1.0 part by weight [per 100 parts by weight of vinyl aromatic monomer], the dispersed particle diameter of the vinyl aromatic polymer in the enhanced polyethylene group resin particles being obtained is large, and in the foamed molded body being obtained by pre-foaming said particles and further heating and molding them, not only its rigidity is not improved, but the impact resistance intrinsic to the polyethylene group resin is damaged.

Accordingly, Appellants have identified reversible error in the Examiner's determination that one of ordinary skill in the art would have been led to employ the claimed amounts of a polymerization initiator and/or a styrene component in forming the expandable beads of a styrene-modified linear low-density polyethylene-based resin recited in claims 1 through 9 within the meaning of 35 U.S.C. § 103(a).

NONSTATUTORY OBVIOUSNESS-TYPE DOUBLE PATENTING

The claims of the present application recite, among other things, styrene-modified linear low-density polyethylene-based resin expandable beads containing a gel component comprising 2 to 40 wt% of a graft polymer or containing 2 to 40 wt% of a gel component comprising a graft copolymer, rather than less than containing 2 wt% of a graft polymer or less than 2 wt% of a gel component as recited in the claims of copending Application 10/540,866. However, the Examiner speculates that the optimization of the expandable beads containing a gel component comprising less than 2 wt% of a graft polymer or containing less than 2 wt% of a gel component comprising a graft copolymer required by the claims of

compending Application 10/540,866 would somehow result in the instantly claimed expandable beads containing a gel component comprising 2 to 40 wt% of a graft polymer or containing 2 to 40 wt% of a gel component comprising a graft copolymer. As correctly identified by Appellants at pages 20 and 21 of the Appeal Brief, the Examiner has not explained why and how one of ordinary skill in the art would have been led to form expandable beads containing a gel component comprising 2 to 40 wt% of a graft polymer or containing 2 to 40 wt% of a gel component comprising a graft copolymer contrary to the requirements of the claims of compending Application 10/540,866. The Examiner has provided insufficient facts to depart from the subject matter specifically claimed and required in compending Application 10/540,866.

Accordingly, Appellants have identified reversible error in the Examiner's decision rejecting claims 1 through 9 under nonstatutory obviousness-type double patenting based on the claims of compending Application 10/540,866.

ORDER

In view of the foregoing, the decision of the Examiner rejecting the claims on appeal is reversed.

REVERSED

psb

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